

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

RM

REPLY TO: 5200 Forest Insect and Disease Control

January 10, 1978

SUBJECT: Aspen Disease Survey, R-10

TO: John A. Sandor, Regional Forester
USDA, U. S. Forest Service
Alaska Region (R-10)
Federal Building
Juneau, AK 99802



A survey of the diseases of aspen in the interior of Alaska was made during the first two weeks of last August at the request of Forest Insect and Disease Management, State and Private Forestry, Region 10. The object was to collect and record the occurrence and distribution of the common aspen diseases. This was accomplished by traveling from Fairbanks to Soldotna, via Anchorage; from Anchorage to Tok via Glenallen, and from Tok to Juneau, via the Alaskan Highway by auto. Stops were made at numerous places along these routes to inspect the aspen stands and obtain information on the distribution of various tree diseases.

A brief resume of the diseases, their importance, and distribution is reported herein. A manuscript summarizing the survey will be submitted to the Plant Disease Reporter for publication.

We had anticipated spending two or more days inspecting the beetle-killed spruce stands in the Tyonek infestation, however this was not accomplished due to inclement weather.

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Aspen Disease Survey, R-10

Trunk cankers are the most obvious of the common disease problems on aspen. Some are capable of girdling and killing a tree in two or more years while others so deform the bole that it is useless for commercial purposes. The following canker diseases are reported from Alaska for the first time:

A. Sooty-bark canker, caused by Cenangium singulare, was found in all aspen stands. The fungus enters fresh trunk wounds and infects trees of all sizes. It is the major cause of mortality of larger trees for it girdles them within five or six years following infection. Many dying trees in the town of Soldotna are infected with this canker.

B. Cryptosphaeria canker, caused by Cryptosphaeria populina kills smaller trees and causes trunk decay in larger trees. It was found in every stand examined. The importance of this canker disease is presently being investigated, for, although it is common in aspen stands, it has not been recognized as a true pathogen. Its importance remains to be determined. One of the most important observations made during this survey is that both Cenangium and Cryptosphaeria canker occur not only on aspen, but also on balsam poplar. Both diseases have now been found from New Mexico northward to Canada and Alaska and could be circumpolar in distribution. Two young stands that we saw had originated from fire approximately twenty-five years ago. Several old, large balsam poplars, some now dead, were infected with the canker fungi. They were the source of infection to the new stand.

C. Ceratocystis canker, cause by Ceratocystis fimbriata, is probably the most common canker found on live aspen. Tree diameter growth is usually greater than canker enlargement, consequently tree mortality from this disease is uncommon. Although it was found in most stands, its greatest impact is trunk deformity.

D. Cytospora canker, caused by Cytospora chrysosperma is considered a weak parasite that attacks wounded bark and trees that have been subjected to environmental or biological stress. It is common on all poplars throughout their range. The fungus was present on live and dead trees in all stands. Both stages of the fungus were collected.

E. Hypoxylon canker, the most common and damaging to aspen in the Lake States region, was not found. Specimens from one incipient canker and an old callused out canker, typical of Hypoxylon, were collected. Although ascospores similar to Hypoxylon were found in remanent perithecia of the old canker, sufficient canker material was not available for a positive identification.

The decay fungi of aspen in Alaska have previously been reported^{1/}. Only a few known to cause cull were collected, mainly for a distribution record. Phellinus tremulae, the most common trunk rot fungus of aspen throughout its range, was noted as being present in most older stands.

^{1/}Cash, Edith K. 1953. A check list of Alaskan fungi. Plant Dis. Rep. Suppl. 219:3-69.

Kimmy, J. W., and John A. Stevenson. 1957. A forest disease survey of Alaska. Plant Dis. Rep. Suppl. 247:87-98.

Robert L. Gilbertson. 1978. Basidiomycetes that decay aspen in North America. Publ. by J. Cramer, Weinheim, W. German (In press).

Peniophora polygonia is the second most important trunk rot of aspen in the southern Rockies. It was found in three different areas indicating that it is widespread and may likewise be important in causing trunk rot in Alaska. Cryptochaete rufa is normally considered a slash rotting fungus, but is sometimes found fruiting on large dead trunk areas. It likewise was found in several areas.

Three rootrot fungi were collected. Armillariella mellea was found associated with extensive mortality of saplings on the Bonanza Creek Forest Experiment Station. Pholiota squarrosa var. squarrosa, a buttrot fungus, was collected in the same area. Ganoderma applanatum, which causes root and buttrot, was collected near Tok. It is no doubt more widespread than noted.

* The black leaf spot, caused by Marssonina populi, is one of the most common leaf diseases of aspen anywhere. Because it is not detrimental to a tree, the disease is usually considered unimportant. It was observed several times and collected twice, indicating that it is widely distributed. Ink spot, caused by Ciborina spp., which causes considerable early defoliation, was not found. This is not to say it is not present in Alaska. It frequently infests large areas of aspen in midsummer.

The "shepherds crook" disease, caused by Pollaccia radiosa, attacks the current growth of suckers resulting in tip die-back and stem mortality. It was collected in three different areas indicating its wide distribution. A similar shoot blight of balsam poplar caused by Venturia populina was also found on sprouts coming in after clear cutting near Talkeetna. These two fungi can be important on sprouts in future clearcut areas.

Fungi associated with trunk rough bark are not considered harmful to the tree for they infect only the outer bark. Rough bark was common on the larger trees throughout most stands. Only two species of fungi were collected from rough bark and more remain to be found.

Several species of staining fungi caused by Ceratocystis have previously been reported in Alaska. The two species collected on aspen are of no great importance and were collected merely to extend their known range.

A general impression gained from observing the aspen diseases and stands in interior Alaska is that they resemble those of the Rocky Mountain region rather than those of the Lake States region. The amount of annual precipitation in the interior may well be the reason. The young stands have a normal complement of diseases and natural mortality. As the older stands begin to break up at about 90 years of age, sprouting does occur and uneven-aged stands are not rare.

The canker diseases appear to be as widely distributed, as frequent, and the same as those found in Colorado and adjacent states. The failure to find Hypoxylon canker in Alaska does not mean that it does not occur there. In contrast to the Lake States area where the canker is estimated to kill 1 to 2 percent of the aspen annually, the canker is only sporadically found in the southern Rockies. The canker was not found in the western U. S. until as recently as 1955 and it will no doubt be found in Alaska in the future.

* From the meager collections of decay fungi, and the earlier reports of their occurrence, it appears that their rank in importance in causing defect is again more similar to those found in Colorado. The same could be said for the root and buttrot fungi.

Portions of the specimens collected will be sent to the Forestry Sciences Laboratory, Juneau, and the others placed in the herbarium at the Rocky Mountain Station.

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List of fungi collected or occurrence noted in Alaska aspen stands.

Canker fungi

1. Cryptosphaeria populina (Pers.) Sacc.
2. Cenangium singulare (Rehm.) Davidson & Cash
3. Ceratocystis fimbriata Ell. & Halst.
4. Cytospora chrysosperma Pers. ex Fr.

Decay fungi

5. Cryptochaeta rufa (Fr.) Boidin
6. Peniphora polygonia (Pers. ex Fr.) Bourd.
7. Armillariella mellea (Vahl. ex Fr.) Karst.
8. Pholiota squarrosa var. squarrosa
9. Ganoderma applanatum (Pers. ex Wallr.) Pat.
10. Phellinus tremulae (Bond.) Bond. et Boris.

Leaf disease or die-back

11. Marssonina populi (Lib.) Sacc.
12. Pollacia radiosa (Lib.) Bald. & Cif.
13. Venturia populina (Vuill.) Fabric.
14. Cenangium populneum (Pers.) Rehm.

Rough bark

15. Rhytidella baranyayi Funk & Zalaska
16. Curcurbitaria staphula Dearness

Miscellaneous

17. Ceratocystis alba DeVay & Davidson
18. Ceratocystis crassivaginata Griffin

Collection areas and fungi.

- Area 1. Fairbanks Creek: 7 miles E of Highway 6. 65° 3'N, 147° 20'W.
No. 1 collected. Nos. 2 and 3 common.
- Area 2. 2 miles N of Fox on Highway 2.
No. 1 collected. Nos. 2 and 3 common.
- Area 3. Bonanza Creek Forest Experiment Station.
Nos. 1, 2, 3, 7, 8, 12, and 16 collected.
Nos. 1, 2, and Pleurotus ostreatus, collected on balsam poplar
(Populus balsamifera).
- Area 4. 20 miles SW Fairbanks on Highway 3. 64° 45'N, 148° 15'W.
Nos. 1, 2, 5, 6, 11 and 15 collected. No. 3 common.
- Area 5. 9 miles N of Nenana on Highway 3, 64° 35'N, 149° 0'W.
Nos. 1, 2, and 4 collected. No. 3 common.
- Area 6. North entrance to Mt. McKinley National Park on Highway 3.
No. 1 collected. No. 3 common.
- Area 7. E of Highway towards Talkeetna.
No. 14 collected on balsam poplar.
Venturia populina shoot blight of balsam poplar present.
- Area 8. 4 miles W of Wasilla, on Highway 3. 61° 33'N, 149° 30'W.
No. 1 collected. Nos. 2, 3, common.
- Area 9. North end of Kenai Lake on Highway 1. 60° 29'N, 149° 45'W.
Nos. 2, 3, and 5 collected.
No. 1 collected on balsam poplar.
- Area 10. 2 miles W of Cooper Landing on Highway 1.
Nos. 1, 5, 15 & 16 collected. Nos. 2 and 3 common.
- Area 11. City of Soldotna
No. 1 collected. Nos. 2 and 3 common.

- Area 12. Matanuska Glacier Wayside Campground on Highway 1, W of Tahnetta Pass. $61^{\circ} 47'N$, $147^{\circ} 55'W$.
Nos. 1, 2, 3, 12 and 17 collected. No. 3 common.
- Area 13. 9 miles N of Glenallen on Highway 4. Mile 122 on Richardson Highway.
Nos. 1, 2, and 6 collected.
No. 1 collected on balsam poplar.
- Area 14. Moon Lake Wayside Campground, 18 miles W of Tok on Highway 2.
Nos. 1, 2, 5, 6, 7, and 18 collected. No. 3 common.
- Area 15. 10 miles W of Canadian border on Highway 2. $60^{\circ} 56'N$, $141^{\circ} 33'W$.
Nos. 3 and 9 collected.
Nos. 1 and 2 common.
- Area 16. 10 miles N. of Burwash, Yukon Territory, Mile 1782 Alaskan Highway.
Nos. 2, 3, 12 and 16 collected.
No. 2 collected on balsam poplar.
- Area 17. 3 miles N of Haines Junction near Beaver Creek Campground. Mile 1639 on Alaskan Highway.
Nos. 1, 2, and 11 collected.
No. 1 collected on balsam poplar.
- Area 18. Chandler Creek, Moosehorn Lake. $66^{\circ} 58'N$, $143^{\circ} 55'W$.
Nos. 2, 15, and 18 collected. Also Tyromyces albellus?
- Area 19. Chandler Creek, Mink Lake. $67^{\circ} 5'N$, $143^{\circ} 40' W$.
No. 5 collected.
- Area 20. $67^{\circ} 5'N$, $145^{\circ} 8'W$.
Nos. 4 and 5 collected.
- Area 21. $67^{\circ} 3'N$, $145^{\circ} 10'W$.
No. 5 collected.

Note: Areas 16 and 17 are located in Yukon Territory and areas 18-21 are northeast of Fairbanks, not on the map.

